

**WHAT IS CLAIMED IS:**

1. A magnetic memory device using two metal lines to control a combined magnetic field created thereof, comprising:
  - a magnetic memory element connecting to a substrate at a first end thereof;
  - a first metal line connecting to a second end of the magnetic memory element; and
  - a second metal line crossing perpendicularly over the first metal line for jointly generating the combined magnetic field,  
wherein the second metal line is on the side of the second end of the magnetic memory element.
2. The device of claim 1 further comprising an insulation layer separating the first metal line from the second metal line.
3. The device of claim 1 wherein the first metal line is fabricated using non-chemical-mechanical-polish processes.

4. The device of claim 1 wherein the thickness of the first or second metal line is between 200 Å to 4000 Å.

5. The device of claim 1 wherein the thickness of the first or second metal line is lower than 1000 Å.

6. The device of claim 1 wherein the magnetic memory element connects directly to the substrate on the first end through a straight line connection path.

7. The device of claim 6 wherein the straight line connection path passes through at least one metal layer from the first end of the magnetic memory element.

8. A magnetic memory device using two metal lines to control a combined magnetic field created thereof, comprising:

a transistor device formed on top of a substrate;  
a magnetic tunnel junction device (MTJ) connected to the transistor device through a straight line connection line;

a first metal line over the MTJ and connected with the MTJ; and  
a second metal line situated cross perpendicular to the first metal line,  
over the first metal line, and separated from the first metal line by an insulation  
region for jointly generating the combined magnetic field.

9. The device of claim 8 wherein the first metal line is fabricated without using a chemical-mechanical-polish process.
10. The device of claim 8 wherein the thickness of the first or second metal line is lower than 1000 Å.
11. The device of claim 8 wherein the MTJ further includes a free ferromagnetic layer, an insulating tunnel junction layer, and a pinned ferromagnetic layer.
12. A method for fabricating a memory device, comprising:  
forming a transistor device on a substrate;  
forming a magnetic tunnel junction device (MTJ) connected to the transistor device through a straight line connection line;

forming a first metal line over the MTJ and connected with the MTJ;  
forming an insulation layer over the first metal line; and  
forming a second metal line situated cross perpendicular to the first metal  
line and separated from the first metal line by the insulation region for jointly  
generating the combined magnetic field.

13. The method of claim 12 further comprising forming one or more  
interconnects along with the connection line to connect the transistor device and  
the MTJ through one or more metal layers.

14. The method of claim 12 wherein the forming a first metal line and  
the forming a second metal line use one or more non-chemical-mechanical-  
polish processes.

15. The method of claim 12 wherein the thickness of the first or second  
metal line is lower than 1000 Å.

16. The method of claim 12 wherein the thickness of the first or second  
metal line is between 200 Å to 4000 Å.